



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

# ODI RESUME

**Investigation:** RQ 23-004  
**Date Opened:** 08/17/2023  
**Investigator:** Jayson Winick **Reviewer:** Peter Kivett  
**Approver:** Tanya Topka  
**Subject:** High Voltage Battery Contactor Failure

## MANUFACTURER & PRODUCT INFORMATION

**Manufacturer:** Ford Motor Company  
**Products:** 2021-2022 Ford Mustang Mach E  
**Population:** 64,727 (Estimated)  
**Problem Description:** High voltage battery contactors may overheat resulting in a loss of motive power.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
<b>Complaints:</b>	12	TBD	12
<b>Crashes/Fires:</b>	0	TBD	TBD
<b>Injury Incidents:</b>	0	TBD	TBD
<b>Number of Injuries:</b>	0	TBD	TBD
<b>Fatality Incidents:</b>	0	TBD	TBD
<b>Number of Fatalities:</b>	0	TBD	TBD
<b>Other*:</b>	44	Confidential	Confidential

\*Description of Other: Early Warning Reporting Field Reports

## ACTION / SUMMARY INFORMATION

**Action:** Open this Recall Query (RQ)

### Summary:

On June 10, 2022, Ford Motor Company (Ford) issued a safety recall (NHTSA Recall 22V-412) on 48,924 model year (MY) 2021-2022 Ford Mustang Mach-E vehicles produced from May 27, 2020, to May 24, 2022. This recall addressed high voltage battery main contactors that may overheat from direct current ("DC") fast-charging and repeated wide-open pedal events. Overheating may lead to arcing or deformation of the electrical contact surfaces, which may result in a contactor that remains open or a contactor that welds closed. An overheated contactor that opens while driving may result in an immediate loss of motive power without re-engagement, increasing the risk of a crash.

The Office of Defects Investigation (ODI) has opened this Recall Query (RQ) after receiving 12 consumer complaints alleging a high voltage battery main contactor failure in MY 2021-2022 Ford Mach-E vehicles (subject vehicles) that were included in Recall 22V-412 and remedied prior to the reported incidents. The remedy in this recall was a Secondary On-Board Diagnostic Control Module (SOBDMC) software update to monitor contactor temperature and reduce battery power to prevent damage to the contactor, and a Battery Energy Control Module (BECM) software update to monitor contactor resistance to identify an overheated contactor and reduce vehicle power to prevent further damage.

Following the recall, Ford issued Technical Service Bulletin TSB 23-2020, to replace the High Voltage Battery Junction Box (HVBJB) on the subject vehicles. Consumers who experienced loss of motive power after receiving the recall remedy reported that their vehicle had the HVBJB replaced, as outlined in TSB 23-2020, to properly remedy the failure of the contactors. This RQ has been opened to assess the remedy of Recall 22V-412.

The ODI complaints cited above can be viewed at [NHTSA.gov](https://www.nhtsa.gov) under the following ODI identification numbers:  
11472202, 11475350, 11477025, 11479095, 11479421, 11485995, 11493140, 11510437, 11511316, 11517977,  
11525550, 11526050.

# Part 573 Safety Recall Report

# 22V-412

**Manufacturer Name :** Ford Motor Company**Submission Date :** JUN 10, 2022**NHTSA Recall No. :** 22V-412**Manufacturer Recall No. :** 22S41**Manufacturer Information :**

Manufacturer Name : Ford Motor Company

Address : 330 Town Center Drive

Suite 500 Dearborn MI 48126-2738

Company phone : 1-866-436-7332

**Population :**

Number of potentially involved : 48,924

Estimated percentage with defect : 100 %

**Vehicle Information :**

Vehicle 1 : 2021-2022 Ford Mustang Mach-E

Vehicle Type : LIGHT VEHICLES

Body Style : ALL

Power Train : NR

**Descriptive Information :** The recalled Secondary On-Board Diagnostic Control Module (SOBDMC) and the Battery Energy Control Module (BECM) software were introduced into production on 05/27/2020 and was taken out of production on 05/24/2022.

These vehicles are not produced in VIN order. Information as to the applicability of this action to specific vehicles can best be obtained by either calling Ford's toll-free line (1-866-436-7332) or by contacting a local Ford or Lincoln dealer who can obtain specific information regarding the vehicles from the Ford On-line Automotive Service Information System (OASIS) database.

Production Dates : MAY 27, 2020 - MAY 24, 2022

VIN Range 1 : Begin :

NR

End : NR

 Not sequential**Description of Defect :**

**Description of the Defect :** Direct Current ("DC") fast charging and repeated wide open pedal events can cause the high voltage battery main contactors to overheat. Overheating may lead to arcing and deformation of the electrical contact surfaces, which can result in a contactor that remains open or a contactor that welds closed.

FMVSS 1 : NR

FMVSS 2 : NR

**Description of the Safety Risk :** An overheated contactor that opens while driving can result in a loss of motive power, which can increase the risk of an accident.

**Description of the Cause :** The design and part-to-part variation of the high voltage battery main

**Identification of Any Warning that can Occur :** contactor is not robust to the heat generated during DC fast charging and multiple wide open pedal events.  
If the contactor opens while driving, a powertrain malfunction warning light will be illuminated and the vehicle will display "Stop Safely Now" in the cluster when the vehicle experiences an immediate loss of motive power. Should the contactors weld closed while driving, a powertrain malfunction warning light will be illuminated on the next drive cycle, along with a no start condition.

## Involved Components :

**Component Name 1 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R19 – 3P AWD

**Component Part Number :** LJ98-14G069-FR

**Component Name 2 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R19 – 3P RWD

**Component Part Number :** LJ98-14G069-ER

**Component Name 3 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R19 – 4P AWD

**Component Part Number :** LJ98-14G069-DR

**Component Name 4 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R19 – 4P RWD

**Component Part Number :** LJ98-14G069-CR

**Component Name 5 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R30 – 3P AWD

**Component Part Number :** LJ98-14G069-FS

**Component Name 6 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R30 – 3P RWD

**Component Part Number :** LJ98-14G069-ES

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**Component Name 7 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R30 – 4P AWD

**Component Part Number :** LJ98-14G069-DS

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**Component Name 8 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R30 – 4P RWD

**Component Part Number :** LJ98-14G069-CS

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**Component Name 9 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R31/R32 – 3P AWD

**Component Part Number :** LJ98-14G069-FT

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**Component Name 10 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R31/R32 – 3P RWD

**Component Part Number :** LJ98-14G069-ET

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**Component Name 11 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R31/R32 – 4P AWD

**Component Part Number :** LJ98-14G069-DT

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**Component Name 12 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R31/R32 – 4P RWD

**Component Part Number :** LJ98-14G069-CT

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**Component Name 13 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R33 – 3P AWD

**Component Part Number :** LJ98-14G069-FU

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**Component Name 14 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R33 – 3P RWD

**Component Part Number :** LJ98-14G069-EU

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**Component Name 15 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R33 – 4P AWD

**Component Part Number :** LJ98-14G069-DU

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**Component Name 16 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R33 – 4P RWD

**Component Part Number :** LJ98-14G069-CU

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**Component Name 17 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R41 – 3P AWD

**Component Part Number :** LJ98-14G069-AXB

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**Component Name 18 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R41 – 3P RWD

**Component Part Number :** LJ98-14G069-AZB

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**Component Name 19 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R41 – 4P AWD

**Component Part Number :** LJ98-14G069-BBB

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Component Name 20 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R41 – 4P RWD

Component Part Number : LJ98-14G069-BDB

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Component Name 21 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R42/R43 – 3P AWD

Component Part Number : LJ98-14G069-AXC

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Component Name 22 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R42/R43 – 3P RWD

Component Part Number : LJ98-14G069-AZC

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Component Name 23 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R42/R43 – 4P AWD

Component Part Number : LJ98-14G069-BBC

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Component Name 24 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R42/R43 – 4P RWD

Component Part Number : LJ98-14G069-BDC

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Component Name 25 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 – 3P AWD

Component Part Number : LJ98-14G069-AXD

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Component Name 26 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 – 3P RWD

Component Part Number : LJ98-14G069-AZD

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**Component Name 27 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 – 4P AWD

**Component Part Number :** LJ98-14G069-BDD

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**Component Name 28 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 – 4P RWD

**Component Part Number :** LJ98-14G069-BDD

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**Component Name 29 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 SR1 – 3P AWD

**Component Part Number :** LJ98-14G069-AXE

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**Component Name 30 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 SR1 – 3P RWD

**Component Part Number :** LJ98-14G069-AZE

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**Component Name 31 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 SR1 – 4P AWD

**Component Part Number :** LJ98-14G069-BBE

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**Component Name 32 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 SR1 – 4P RWD

**Component Part Number :** LJ98-14G069-BDE

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**Component Name 33 :** Secondary On-Board Diagnostic Control Module Softw

**Component Description :** R44 SR2/SR3 – 3P AWD

**Component Part Number :** LJ98-14G069-AXF

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Component Name 34 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR2/SR3 – 3P RWD

Component Part Number : LJ98-14G069-AZF

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Component Name 35 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR2/SR3 – 4P AWD

Component Part Number : LJ98-14G069-BBF

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Component Name 36 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR2/SR3 – 4P RWD

Component Part Number : LJ98-14G069-BDF

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Component Name 37 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR4 – 3P AWD

Component Part Number : LJ98-14G069-AXG

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Component Name 38 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR4 – 3P RWD

Component Part Number : LJ98-14G069-AZG

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Component Name 39 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR4 – 4P AWD

Component Part Number : LJ98-14G069-BBG

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Component Name 40 : Secondary On-Board Diagnostic Control Module Softw

Component Description : R44 SR4 – 4P RWD

Component Part Number : LJ98-14G069-BDG

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Component Name 41 : Battery Energy Control Module Software  
Component Description : R19/R30 – 3P  
Component Part Number : LJ98-14C197-AF

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Component Name 42 : Battery Energy Control Module Software  
Component Description : R19/R30 – 4P  
Component Part Number : LJ98-14C197-BF

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Component Name 43 : Battery Energy Control Module Software  
Component Description : R31/R32/R33 – 3P  
Component Part Number : LJ98-14C197-AG

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Component Name 44 : Battery Energy Control Module Software  
Component Description : R31/R32/R33 – 4P  
Component Part Number : LJ98-14C197-BG

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Component Name 45 : Battery Energy Control Module Software  
Component Description : R41/R42 – 3P  
Component Part Number : LJ98-14C197-AH

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Component Name 46 : Battery Energy Control Module Software  
Component Description : R41/R42 – 4P  
Component Part Number : LJ98-14C197-BH

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Component Name 47 : Battery Energy Control Module Software  
Component Description : R43/R44 – 3P  
Component Part Number : NJ98-14C197-AA

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Component Name 48 : Battery Energy Control Module Software

Component Description : R43/R44 – 4P

Component Part Number : NJ98-14C197-BA

Component Name 49 : Battery Energy Control Module Software

Component Description : R44 SR1/SR2/SR3/SR4 – 3P

Component Part Number : NJ98-14C197-AB

Component Name 50 : Battery Energy Control Module Software

Component Description : R44 SR1/SR2/SR3/SR4 – 4P

Component Part Number : NJ98-14C197-BB

## Supplier Identification :

### Component Manufacturer

Name : Ford Motor Company

Address : One American Road  
Dearborn Michigan 48126

Country : United States

## Chronology :

On April 12, 2022, an issue pertaining to high voltage battery main contactor overheating was brought to Ford's Critical Concern Review Group for review.

In April and May of 2022, Ford investigated warranty claims to quantify performance differences between vehicle variants. Ford conducted a read-across of other vehicle lines utilizing high voltage battery contactors.

Between July 13, 2021 and May 31, 2022, there have been 286 warranty claims in North America related to an open or welded contactor. Ford is aware of one VOQ alleging a no-start and listing DTCs related to this concern.

On June 3, 2022, Ford's Field Review Committee reviewed the concern and approved a field action.

Ford is not aware of any reports of accident or injury related to this condition.

## Description of Remedy :

**Description of Remedy Program :** The remedy for this program is a Secondary On-Board Diagnostic Control Module (SOBDMC) and Battery Energy Control Module (BECM) software update. Ford is anticipated to begin Over-The-Air (OTA) deployment to update the SOBDMC an BECM software for affected vehicles in July 2022. Alternatively, owners will have the option to take their vehicle to a Ford or Lincoln dealer to complete the software update. There will be no charge for this service.

Ford provided the general reimbursement plan for the cost of remedies paid for by vehicle owners prior to notification of a safety recall in May 2021. The ending date for reimbursement eligibility is estimated to be January 31, 2023

Ford will forward a copy of the notification letters to dealers to the agency when available.

**How Remedy Component Differs from Recalled Component :** The updated SOBDMC software (LJ98-14G069-AXG, LJ98-14G069-AZG, LJ98-14G069-BBG, LJ98-14G069-BDG) will monitor contactor temperature and intelligently reduce battery power to prevent damage to the contactor. The updated BECM software (NJ98-14C197-AE, NJ98-14C197-BD) will monitor contactor resistance to identify an overheated contactor and reduce vehicle power to prevent further damage.

**Identify How/When Recall Condition was Corrected in Production :** The updated SOBDMC software and BECM software was introduced into production on May 25, 2022.

## Recall Schedule :

**Description of Recall Schedule :** Notification to dealers is expected to occur on June 13, 2022. Mailing of owner notification letters is expected to begin July 18, 2022 and is expected to be completed by July 22, 2022.

**Planned Dealer Notification Date :** JUN 13, 2022 - JUN 13, 2022

**Planned Owner Notification Date :** JUL 18, 2022 - JUL 22, 2022

\* NR - Not Reported